PB-242 537

IMPLEMENTATION PLAN REVIEW FOR INDIANA AS REQUIRED BY THE ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT

Environmental Protection Agency

Prepared for:

Environmental Protection Agency

December 1974

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178105

PB242537

EPA-450/3-74-066

DECEMBER 1974

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EPA-450/3-74-066	PB 242 537
IMPLEMENTATION PLAN REVIEW FOR INDIANA AS REQUIRED BY THE ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT	5. REPORT DATE December 1974 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)	8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, N.C., Regional Office V, Chicago, Illinois and Argonne National Laboratory, Argonne, Illinois	10. PROGRAM ELEMENT NO. 11. CONTRACT/GRANT NO. EPA-IAG-D5-0463
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency Office of Air and Waste Management Office of Air Quality Planning and Standards Research Triangle Park, North Carolina 27711	13. TYPE OF REPORT AND PERIOD COVERED Final 14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT

Section IV of the Energy Supply and Environmental Coordination Act of 1974, (ESECA) requires EPA to review each State Implementation Plan (SIP) to determine if revisions can be made to control regulations for stationary fuel combustion sources without interferring with the attainment and maintenance of the national ambient air quality standards. This document, which is also required by Section IV of ESECA, is EPA's report to the State indicating where regulations might be revised.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air pollution State implementation plans		

18. DISTRIBUTION STATEMENT Release unlimited	19. SECURITY CLASS (This Report) Unclassified	21. NO. OF PAGES 69
	20. SECURITY CLASS (This page) Unclassified	22. PRICE 4.25/2.25

EPA Form 2220-1 (9-73)

PRICES SUBJECT TO CHANGE

EPA-450/3-74-066

IMPLEMENTATION PLAN REVIEW

FOR

INDIANA

REQUIRED BY THE ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT

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IMPLEMENTATION PLAN REVIEW
FOR INDIANA
REQUIRED BY THE ENERGY SUPPLY AND ENVIRONMENTAL COORDINATION ACT

1.0 EXECUTIVE SUMMARY

The enclosed report is the U. S. Environmental Protection Agency's (EPA) response to Section IV of the Energy Supply and Environmental Coordination Act of 1974 (ESECA). Section IV requires EPA to review each State Implementation Plan (SIP) to determine if revisions can be made to control regulations for stationary fuel combustion sources without interfering with the attainment and maintenance of the National Ambient Air Quality Standards (NAAQS). In addition to requiring that EPA report to the state on whether control regulations might be revised, ESECA provides that EPA must approve or disapprove any revised regulations relating to fuel burning stationary sources within three months after they are submitted to EPA by the states. The states may, as in the Clean Air Act of 1970, initiate State Implementation Plan revisions; ESECA does not, however, require states to change any existing plan.

Congress has intended that this report provide the state with information on excessively restrictive control regulations. The intent of ESECA is that SIP's, wherever possible, be revised in the interest of conserving low sulfur fuels or converting sources which burn oil or natural gas to coal. EPA's objective in carrying out the SIP reviews, therefore, has been to try to establish if emissions from combustion sources may be increased. Where an indication can be found that emissions from certain fuel burning sources can be increased and still attain and maintain NAAQS, it may be plausible that fuel resource allocations can be altered for "clean fuel savings" in a manner consistent with both environmental and national energy needs.

In many respects, the ESECA SIP reviews parallel EPA's policy on clean fuels. The Clean Fuels Policy has consisted of reviewing implementation plans with regards to saving low sulfur fuels and, where the primary sulfur dioxide air quality standards were not exceeded, to encourage states to either defer compliance with regulations or to revise the SO_2 emission regulations. The states have also been asked to discourage large scale shifts from coal to oil where this could be done without jeopardizing the attainment and maintenance of the NAAQS.

To date, EPA's fuels policy has addressed only those states with the largest clean fuels saving potential. Several of these states have or are currently in the process of revising SO_2 regulations. These states are generally in the Eastern half of the United States. ESECA, however, extends the analysis of potentially over-restrictive regulations to all 55 states and territories. In addition, the current reviews address the attainment and maintenance of all the National Ambient Air Quality Standards.

There are, in general, three predominant reasons for the existence of overly restrictive emission limitations within the State Implementation Plans. These are: 1) the use of the example region approach in developing state-wide air quality control strategies; 2) the existence of State Air Quality Standards which are more stringent than NAAQS; and 3) the "hot spots" in only part of an Air Quality Control Region (AQCR) which have been used as the basis for controlling the entire region. Since each of these situations affect many state plans and in some instances conflict with current national energy concerns, a review of the State Implementation Plans is a logical follow-up to EPA's initial appraisal of the SIP's conducted in 1972. At that time, SIP's were approved by EPA if they demonstrated the attainment of NAAQS or more stringent state air quality standards. Also, at that time an acceptable method for formulating control strategies was the use of an example region for demonstrating the attainment of the standards.

The example region concept permitted a state to identify the most polluted air quality control region (AQCR) and adopt control regulations which would be adequate to attain the NAAQS in that region. In using an example region, it was assumed that NAAQS would be attained in the other AQCR's of the state if the control regulations were applied to similar sources. The problem with the use of an example region is that it can result in excessive controls, especially in the utilization of clean fuels, for areas of the state where sources would not otherwise contribute to NAAQS violations. For example, a control strategy based on a particular region or source can result in a regulation requiring 1 percent sulfur oil to be burned statewide where the use of 3 percent sulfur coal would be adequate to attain NAAQS in some locations.

EPA anticipates that a number of states will use the review findings to assist them in deciding whether or not to revise portions of their State Implementation Plans. However, it is most important for those states which

desire to submit a revised plan to recognize the review's limitations. The findings of this report are by no means conclusive and are neither intended nor adequate to be the sole basis for SIP revisions; they do, however, represent EPA's best judgment and effort in complying with the ESECA requirements. The time and resources which EPA has had to prepare the reports has not permitted the consideration of growth, economics, and control strategy tradeoffs. Also, there has been only limited dispersion modeling data available by which to address individual point source emissions. Where the modeling data for specific sources were found, however, they were used in the analysis.

The data upon which the reports' findings are based is the most currently available to the Federal Government. However, EPA believes that the states possess the best information for developing revised plans. The states have the most up-to-date air quality and emissions data, a better feel for growth, and the fullest understanding for the complex problems facing them in the attainment and maintenance of quality air. Therefore, those states desiring to revise a plan are encouraged to verify and, in many instances, expand the modeling and monitoring data supporting EPA's findings. In developing a suitable plan, it is suggested that states select control strategies which place emissions for fuel combustion sources into perspective with all sources of emissions such as smelters or other industrial processes. States are encouraged to consider the overall impact which the potential relaxation of overly restrictive emissions regulations for combustion sources might have on their future control programs. This may include air quality maintenance, prevention of significant deterioration, increased TSP, NO_x, and HC emissions which occur in fuel switching, and other potential air pollution situations such as sulfates.

Although the enclosed analysis has attempted to address the attainment of all the NAAQS, most of the review has focused on total suspended particulate matter (TSP) and sulfur dioxide (SO_2) emissions. This is because stationary fuel combustion sources constitute the greatest source of SO_2 emissions and are a major source of TSP emissions.

Part of each state's review was organized to provide an analysis of the SO_2 and TSP emission tolerances within each of the various AQCR's. The regional emission tolerance estimate is, in many cases, EPA's only measure of the "over-

cleaning" accomplished by a SIP. The tolerance assessments have been combined with other regional air quality "indicators" in an attempt to provide an evaluation of a region's candidacy for changing emission limitation regulations. In conjunction with the regional analysis, a summary of the state's fuel combustion sources (power plants, industrial sources, and area sources) has also been carried out.

The following are the principle findings for the State of Indiana. (Air Quality Control Regions are displayed on Figure 1-1.)

- The state has adopted the Federal National Ambient Air Quality Standards for particulates but has adopted more stringent standards for SO_2. Attainment of the state standards would require stricter emission controls than would attainment of federal NAAQS only.

- The statewide regulations for particulates and SO_2 were based on the example region approach. Indiana has, however, initiated changes to the SO_2 regulations which would result in the application of emission limits based on local considerations rather than "worst region" constraints. This concept is consistent with EPA's Clean Fuels Policy analysis and with this ESECA review.

- Within the framework of this limited review, there are indications that there is little tolerance throughout the state for increased particulate emissions and hence relaxed particulate emission regulations. This is due to high TSP readings (based on the 1973 data) and several proposed Air Quality Maintenance Area designations. There are a sufficient number of air quality monitoring sites to warrant this observation.

- For SO_2, there are indications that there is substantial margin for increased emissions in all regions except Chicago (#67) and Cincinnati (#79). The analysis also shows that significant clean fuels savings could be effected in all regions, except these two, through emission regulation relaxation. For Evansville (#77), Louisville (#78), and Indianapolis (#80) these evaluations must be qualified by the consideration that Air Quality Maintenance Areas for SO_2 have been proposed in these regions. For Wabash Valley (#84) a qualification must be added due to the fact that there is only limited SO_2 air quality data available. The state, therefore, can consider permitting the use of fuels with higher sulfur content in several areas.

- The Chicago AQCR (#67) has been designated as a Priority I region for NO_x because of high NO_x readings. Although NO_x is not treated in depth in this review, any change in SO_2 or particulate regulations which might be contemplated for this region must be considered in light of the impact on NO_x emissions. There is little possibility that NO_x emissions can be increased without hampering NAAQS attainment and maintenance.

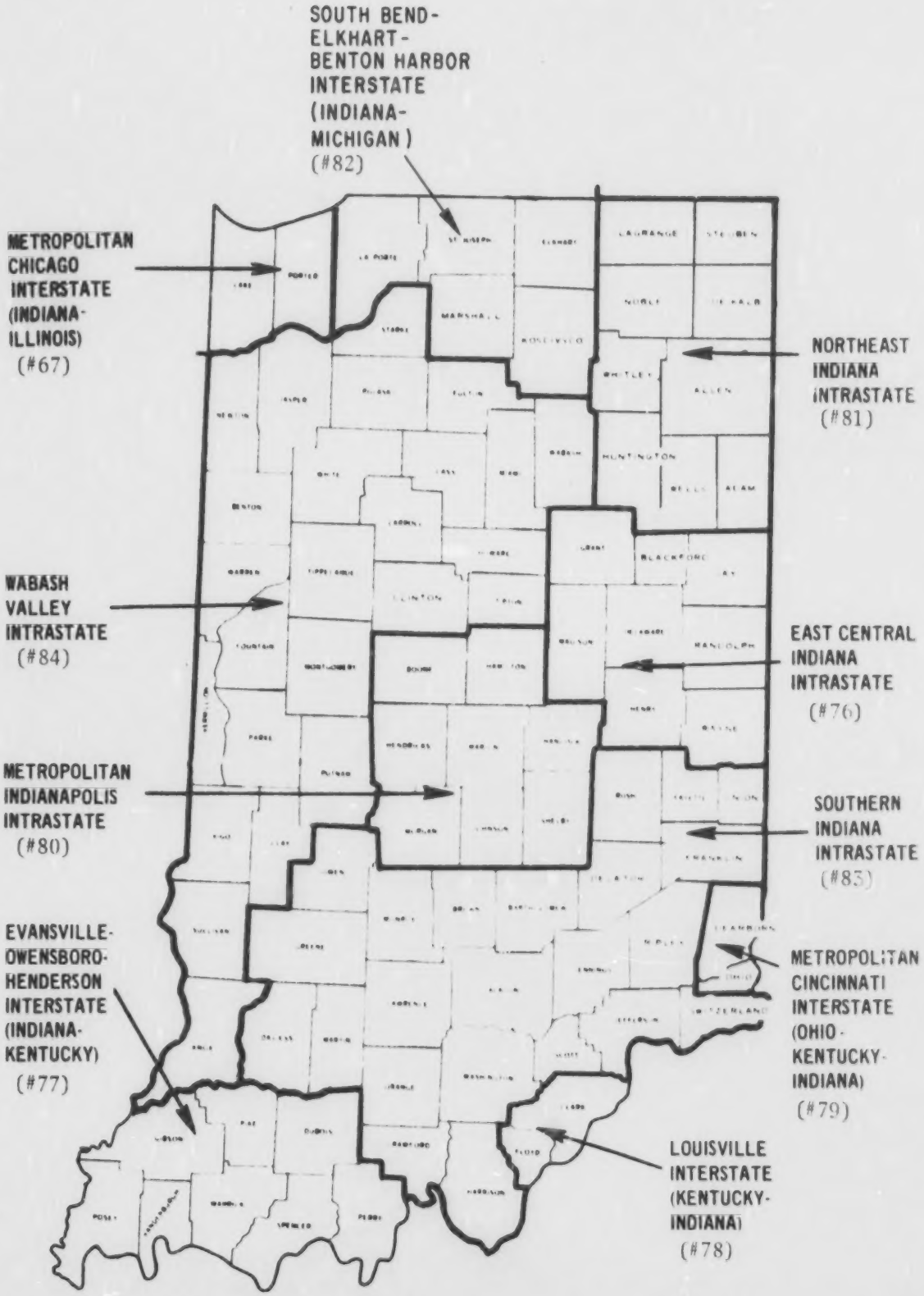

Figure 1-1. Indiana Air Quality Control Regions (AQCR)

- Of the 31 power plants scheduled to be on-line in 1975, all have coal burning capability. Likewise, the vase majority of industrial sources can use coal. Therefore, the major clean fuels conservation impact of SO_2 regulations relaxation will be on increased utilization of high sulfur coal.

2.0 INDIANA STATE IMPLEMENTATION PLAN REVIEW

2.1 Summary

A revision of fuel combustion source emissions regulations will depend on many factors. For example:

- Does the state have air quality standards which are more stringent than NAAQS?
- Does the state have emission limitation regulations for control of (1) power plants, (2) industrial sources, (3) area sources?
- Did the state use an example region approach for demonstrating the attainment of NAAQS or more stringent state standards?
- Has the state not initiated action to modify combustion source emission regulations for fuel savings; i.e., under the Clean Fuels Policy?
- Are there no proposed Air Quality Maintenance Areas?
- Are there indications of a sufficient number of monitoring sites within a region?
- Is there an expected 1975 attainment date for NAAQS?
- Based on (1973) air quality data, are there indications of a tolerance for increasing emissions?
- Are the emissions from stationary fuel combustion sources a relatively small portion of the regional total?
- Do modeling results for specific fuel combustion sources show a potential for a regulation revision?
- Is there a significant clean fuels savings potential in the region?
- Must the regulations be relaxed in order to accomplish significant fuel switching?

The following portion of this report is directed at answering these questions. An AQCR's potential for revising regulations increases when there are affirmative responses to the above.

The initial part of the SIP review report, Section 2 and Appendix A, is organized to provide the background and current situation information for the State Implementation Plan. Section 3 and the remaining Appendices provide an AQCR analysis which helps establish the overall potential for revising regulations. An evaluation of regional air quality indicators is presented in Appendix B; power plants, industrial sources, and area sources are analyzed in Appendices C, D, and E respectively.

Based on an overall evaluation of EPA's current information, AQCR's have been classified as good, marginal, or poor candidates for regulation revisions. Table 2-1 summarizes the State Implementation Plan Review. The remaining portions of the report support this summary with explanations.

2.2 Air Quality Setting for the State of Indiana

2.2.1 Indiana Air Pollution Control Areas

The State of Indiana is divided into ten Air Quality Control Regions (AQCRs), as shown in Fig. 1-1. There are five intrastate and five interstate regions. Table A-1 gives the pollutant priority classifications for each of the ten regions.

The table also shows population and population density to be largest in the four metropolitan areas of Chicago (#67), Cincinnati (#79), Indianapolis (#80), and Louisville (#78). Based on present conditions and growth projections for the state, four counties have been designated as Air Quality Maintenance Areas (AQMAs) for particulates and for sulfur dioxide. These are indicated in Table A-1 and Fig. A-1.

2.2.2 Indiana Ambient Air Quality Standards

As shown in Table A-2, Indiana has adopted all of the federal primary and secondary National Ambient Air Quality Standards (NAAQS) for particulates, sulfur oxides, and nitrogen dioxide, with some exceptions. Indiana has maintained the original federal secondary annual and 24-hour standards for SO_2. These standards were rescinded by the EPA in July 1973. The state has also adopted a one-hour standard in addition to the federal three-hour secondary standard. In the analysis to follow, however, attainment only of the federal NAAQS will be considered.

Table 2-1. State Implementation Plan Review Summary for Indiana

"INDICATORS"	State		Metropolitan Chicago AQCR #67		East Central Indiana AQCR #76		Evansville-Owensboro AQCR #77		Louisville[a] AQCR #78	
	TSP	SO_2	TSP	SO_2	TSP	SO_2	TSP	SO_2	TSP	SO_2
• Does the State have air quality standards which are more stringent than NAAQS?										
• Does the State have emission limiting regulations for control of: 1. Power plants 2. Industrial sources 3. Area sources	YES YES NO	YES YES NO								
• Did the State use an example region approach for demonstrating the attainment of NAAQS or more stringent State standards?	YES	YES	Example Region						Example Region	
• Has the State not initiated action to modify combustion source emission regulations for fuel savings; i.e., under the Clean Fuels Policy?	YES	NO								
• Are there no proposed Air Quality Maintenance Areas?			NO	NO	YES	YES	NO	NO	YES	NO[b]
• Are there indications of a sufficient number of monitoring sites within a region?			YES	YES	YES	YES	YES	YES	YES	YES
• Is there an expected 1975 attainment date for NAAQS?			NO	NO	YES	YES	YES	YES	YES	YES
• Based on (1973) Air Quality Data, are there no reported violations of NAAQS?			NO	NO	NO	YES	NO	YES	NO	YES
• Based on (1973) Air Quality Data, are there indications of a significant tolerance for increasing emissions?			NO	NO	NO	YES	NO	YES	NO	YES
• Are the emissions from stationary fuel combustion sources a relatively small portion of the regional total?			YES	NO	NO	NO	NO	NO	YES	NO
• Do modeling results for specific fuel combustion sources show a potential for a regulation revision?			NA	NA	NA	NA	NA	YES	NA	YES
• Is there a significant Clean Fuels Saving potential in the region?			NO		YES		YES		YES	
• Must the regulations be revised to accomplish significant fuel switching?			YES		YES		YES		YES	
• Based on the above indicators, what is the potential for revising fuel combustion source emission limiting regulations?			TSP - Poor SO_2 - Poor		TSP - Poor SO_2 Good		TSP - Poor SO_2 - Marginal		TSP - Poor SO_2 - Marginal	

Table 2-1. State Implementation Plan Review Summary of Indiana (Contd.)

"INDICATORS"	Cincinnati[a] AQCR #79		Indianapolis AQCR #80		Northeast Indiana AQCR #81		South Bend-Elkhart[a] AQCR #82		Southern Indiana AQCR #83	
	TSP	SO_2	TSP	SO_2	TSP	SO_2	TSP	SO_2	TSP	SO_2
• Does the State have air quality standards which are more stringent than NAAQS?										
• Does the State have emission limiting regulations for control of: 1. Power plants 2. Industrial sources 3. Area sources										
• Did the State use an example region approach for demonstrating the attainment of NAAQS or more stringent State standards?			Example Region							
• Has the State not initiated action to modify combustion source emission regulations for fuel savings; i.e., under the Clean Fuels Policy?										
• Are there no proposed Air Quality Maintenance Areas?	NO[c]	YES	NO	NO	YES	YES	YES	YES	YES	YES
• Are there indications of a sufficient number of monitoring sites within a region?	YES	YES	YES	YES	NO	YES	YES	YES	YES	YES
• Is there an expected 1975 attainment date for NAAQS?	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
• Based on (1973) Air Quality Data, are there no reported violations of NAAQS?	NO	YES	NO	YES	YES	YES	NO	YES	NO	YES
• Based on (1973) Air Quality Data, are there indications of a significant tolerance for increasing emissions?	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
• Are the emissions from stationary fuel combustion sources a relatively small portion of the regional total?	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO
• Do modeling results for specific fuel combustion sources show a potential for a regulation revision?	NA	NO	NA	YES	NA	NA	NA	YES	NA	YES
• Is there a significant Clean Fuels Saving potential in the region?	NO		YES		YES		YES		YES	
• Must the regulations be revised to accomplish significant fuel switching?	YES		YES		YES		YES		YES	
• Based on the above indicators, what is the potential for revising fuel combustion source emission limiting regulations?	TSP - Poor SO_2 - Poor		TSP - Poor SO_2 - Marginal		TSP - Marginal SO_2 - Good		TSP - Poor SO_2 - Good		TSP - Poor SO_2 - Good	

Table 2-1. State Implementation Plan Review Summary of Indiana (Contd.)

"INDICATORS"	Wabash Valley AQCR #84 TSP	Wabash Valley AQCR #84 SO_2
• Does the State have air quality standards which are more stringent than NAAQS?		
• Does the State have emission limiting regulations for control of: 1. Power plants 2. Industrial sources 3. Area sources		
• Did the State use an example region approach for demonstrating the attainment of NAAQS or more stringent State standards?		
• Has the State not initiated action to modify combustion source emission regulations for fuel savings; i.e., under the Clean Fuels Policy?		
• Are there no proposed Air Quality Maintenance Areas?	YES	YES
• Are there indications of a sufficient number of monitoring sites within a region?	YES	NO
• Is there an expected 1975 attainment date for NAAQS?	YES	YES
• Based on (1973) Air Quality Data, are there no reported violations of NAAQS?	NO	YES
• Based on (1973) Air Quality Data, are there indications of a significant tolerance for increasing emissions?	NO	YES
• Are the emissions from stationary fuel combustion sources a relatively small portion of the regional total?	NO	NO
• Do modeling results for specific fuel combustion sources show a potential for a regulation revision?	NA	YES
• Is there a significant Clean Fuels Saving potential in the region?	YES	
• Must the regulations be revised to accomplish significant fuel switching?	YES	
• Based on the above indicators, what is the potential for revising fuel combustion source emission limiting regulations?	TSP - Poor SO_2 - Marginal	

[a]Interstate [b]There is a proposed AQMA in the Kentucky portion of the region. [c]There is a proposed AQMA in the Ohio portion of the region.

2.2.3 Indiana Air Quality Status

The current air quality status in Indiana is summarized in Table A-3 for particulates and Table A-4 for sulfur dioxide. All data came from the SAROAD data bank as of June 1974.

With the exception of Northeast Indiana (#81), all AQCRs in the state show violations of the particulate standards, although neither Northeast Indiana nor Southern Indiana (#83) has very many reporting stations. Severest particulate problems are in the Chicago (#67), Cincinnati (#79), Louisville (#78), and Evansville (#77) regions, all of which require large emission reductions to meet the secondary NAAQS. The data are consistent with the AQMA designations for particulates. Indications are that relaxation of particulate emission regulations will not be possible without disrupting NAAQS attainment.

Metropolitan Chicago (#67) is the only region showing SO_2 violations, but just 4 stations out of 100 are reporting excesses. Five of the regions [East Central Indiana (#76), Northeast Indiana (#81), South Bend-Elkhart-Benton Harbor (#82), Southern Indiana (#83), and Wabash Valley (#84)] have only a few reporting stations. The indications are that some regions of the state can absorb increases in SO_2 emissions without violating the NAAQS, and this is encouraging from a clean fuels conservation perspective.

2.2.4 Indiana Emissions Summary

Emission sources and emission rates are tabulated in Tables A-5 to A-8.

In the 10 AQCR area, Indiana fuel combustion sources account for 33% of the particulate and 71% of the SO_2 emissions. With the exception of Metropolitan Chicago (#67), Louisville (#78), and Cincinnati (#79), Indiana fuel combustion sources contribute half or more of the particulate emissions. Since only Northeast Indiana (#81) is not showing particulate standard violations, any particulate regulation relaxation would have to be accompanied by a regulation tightening in other sectors in order to achieve required emission reductions. Also, Table A-6 shows that power plants, industrial/commercial/institutional point sources, and area sources are roughly equivalent in their contribution to the particulate emissions in the 10 region area although one or the other source may dominate in a given region. Hence, the lack of margin for particulate regulation relaxation applies to all fuel combustion sources.

The rollback calculations for SO_2 indicate that theoretically all AQCRs in Indiana except Metropolitan Chicago (#67) might tolerate SO_2 regulation relaxation, but since 71% of the regional SO_2 emissions are from fuel combustion sources in Indiana any relaxation for these sources would have to be done cautiously. Furthermore, Chicago (#67), Evansville (#77), and Indianapolis (#80) all contain counties with AQMA designations for SO_2. Thus, any emission relaxation in those AQCRs has the potential for jeopardizing NAAQS maintenance.

Table A-7 shows that for SO_2 emissions, power plants predominate, so that any change in their emission regulations would be felt strongly in regional air quality changes. Area sources are significant SO_2 sources in Chicago (#67), East Central Indiana (#76), and Northeast Indiana (#81).

2.3 Background on the Development of the Current State Implementation Plan

2.3.1 General Information

Indianapolis (#80) was chosen as the example region for the development of the Indiana State Implementation Plan. Although particulate and SO_2 control strategies were based on AQDM and rollback calculations for Indianapolis, potential strategies were also tried on several interstate Indiana AQCRs. Indianapolis was chosen as the example region because of high particulate and SO_2 readings and because it contains the only large metropolitan area entirely within the state.

2.3.2 Particulate Control Strategy

The State Implementation Plan stipulates that particulate control strategies for fuel combustion consist of implementation and enforcement of Air Pollution Control Regulations APC 2-7. For purposes of fuel combustion, this means enforcement of the revised APC-4, whose provisions are shown in Table A-9 and Fig. A-2. Stricter particulate emission limits apply in the Chicago (#67) and Indianapolis (#80) AQCRs than in the rest of the state. In the original APC-4, only Chicago had been subject to the stricter regulation. The present strategies were designed to meet primary standards for particulate air quality throughout Indiana. Secondary standards would not be met in all parts of the state, however.

2.3.3 Sulfur Oxide Control Strategy

Indiana SO_2 emission control strategies for fuel combustion sources consist of enforcement of the regulations outlined in Table A-9 and its accompanying Figure A-3. These strategies were tested both with AQDM and with rollback calculations for the Chicago (#67), Indianapolis (#80), and Louisville (#78) AQCRs. Such calculations showed that primary SO_2 standards could be met by 1975 throughout the state, and that only Chicago (#67) would probably not be able to meet secondary standards without tighter control of emissions.

2.4 Special Considerations for the State of Indiana

2.4.1 Planned SIP Revisions

Relevant to fuel combustion, two new regulations have been approved by the Air Pollution Control Board and are to be considered for acceptance within the State Implementation Plan by EPA. In the first regulation, county-wide Air Quality Basins would be established; they would replace the present Air Quality Control Regions. The second regulation would permit higher sulfur fuel for utilities and industrial boilers in rural areas, while not drastically changing emission regulations elsewhere.

2.4.2 Fuels

Indiana is a heavy user of coal. For power plants, 94% of the heat input is derived from coal, only 1% from oil, and 5% from natural gas. Indiana is also a large supplier of coal ranking sixth in total coal production. Most of the reserves are located in the southwest portion of the state, but Indiana lies between two very large coal reserves in Illinois and Western Kentucky-Ohio. Most of Indiana's coal is of moderate (1-2%) to high (>2%) sulfur content as is the coal in adjacent state reserves. Therefore, the major impact of regulation relaxation in Indiana would be increased use of high sulfur coal.

2.4.3 Fuel Conversions

The Federal Energy Administration has not identified any potential oil-to-coal conversion plants in Indiana.

3. AIR QUALITY CONTROL REGION ASSESSMENTS

3.1 General Methodology

The previous section having set the background for the State Implementation Plan and evaluated the current air quality situation, this section will review the available information for each AQCR to determine the feasibility of relaxing emission regulations in the interest of conserving clean fuels. Care must be taken in interpreting the results of this analysis and the following caveats must be kept in mind: (1) The analytical procedure is intended to provide a first approximation to the evaluation of potential regulation changes (e.g. rollback and single source modeling techniques were used). The state must conduct a more detailed analysis of the situation to confirm or dispute any of these findings prior to submitting any SIP revisions. (2) In many instances the necessary data were unavailable or limited in scope. Where possible, best engineering estimates were used to fill in the gaps. Where better information is available, the state should use it in developing SIP revisions.

The analysis encompasses five distinct considerations for each AQCR. First, the current air quality situation is assessed to determine if the indicators point to the region's ability to tolerate an emission increase without violation of any NAAQS. Most of the data necessary for this review have already been presented in Section 2 and Tables B-1 and B-2 summarize the information for particulates and SO_2 respectively in each AQCR. The assessment is made on the basis of 7 criteria: (1) current air quality violations, (2) expected NAAQS attainment dates, (3) Air Quality Maintenance Area designations, (4) total emissions, (5) portion of emissions from the state's fuel combustion sources, (6) regional emission reduction required (based on rollback calculations), and (7) pollutant priority classification. Note that this evaluation is based strictly on air quality considerations. Determinations of whether regulation relaxation would, in fact, result in clean fuels savings will be made on a source-by-source evaluation.

The second consideration for each AQCR is the power plant assessment and this data is summarized on the tables in Appendix C. All existing and proposed plants are reviewed to estimate the emission reductions to be achieved by the imposition of existing regulations. The clean fuel requirement is determined at the same time. Where dispersion modeling data are available,

the maximum allowable fuel sulfur content which would enable the plant to meet the NAAQS in its immediate vicinity is determined and the resulting emission reduction (or increase) is calculated and compared to that produced by existing regulations and to what the region requires. For the purposes of this report, the SO_2 modeling data used[1] assumes the power plant fuel use pattern in 1975 will be the same as that existing in 1971 with the addition of fuel consumption for new units coming on-line. The choice of 1971 as the baseline year is based on the consideration that fuel switching to achieve SIP emission regulations did not begin nationwide until 1972; therefore 1971 represents consumption patterns which are not dictated by emission regulations but rather by the economics of fuel availability. In terms of the maximum allowable fuel sulfur content determined from the modeling, the 1971 fuel sulfur content is used as an upper bound. For particulate emissions, plants currently below required SIP emission levels are assumed to remain so. No particulate modeling results were available. Fuel use data[2,3] and emission data[4,5] are drawn from both published and unpublished sources.

The third consideration for each AQCR is the assessment of large industrial/commercial/institutional point sources and the summary data is presented in Appendix D. The procedure is effectively equivalent to that carried out for power plants in that resulting emission reductions achieved through the application of existing regulations are determined along with clean fuel requirements. Emission and fuel use data were drawn from the National Emission Data System (NEDS) file.[5] No individual source modeling data were available.

The fourth consideration is area source assessments. The fuel use patterns, emission reductions, and clean fuel requirements determined by existing regulations is computed for these sources using NEDS data.[5] The results are summarized in Appendix E.

The fifth consideration is a synthesis of the first four in that the emission reductions that are imposed on all sources in the region are totaled and compared to required reductions. Fuel use requirements are also aggregated for the region. Summary tables are in Appendix F.

At this point, an overall assessment of the potential for regulation revision and resulting clean fuel savings can be made. The findings for each AQCR have been summarized on Table 2-1 and in Section 1. An AQCR is determined

to be a good candidate for emission limit regulation revision if the air quality indicators show that the region has a tolerance to absorb increased emissions and if the source-by-source evaluations show that significant clean fuels savings could be effected by such revision. If the air quality situation is such that no emission increase could be tolerated and/or if the source evaluations show little or no clean fuels savings potential, then the region is classified as a poor candidate for regulation revision. If the air quality or the clean fuels savings evaluations are inconclusive or show conflicting information, then the region is assessed as a marginal candidate for regulation revision. A much more detailed analysis must be carried out by the state to resolve the situation.

3.2 Metropolitan Chicago Interstate AQCR (#67)

3.2.1 Regional Air Quality Assessment

There are widespread high particulate levels in this AQCR. Although Indiana combustion sources are contributing a small portion of the region's particulate load (18% from Table B-1), this still amounts to a substantial emission rate (117,000 tons per year from Table A-6). The regional air quality, therefore, has virtually no capacity to absorb increased particulate emissions.

High SO_2 levels are also found in this AQCR (see Table B-2). Indiana fuel combustion sources are contributing just less than half of the region's SO_2 emissions, and hence any regulation change would substantially affect regional SO_2 levels.

Although not treated in depth in this report, this region, which includes the City of Chicago, is one of five in the country that is rated as Priority I for nitrogen oxides. Emissions are about equally divided between stationary and mobile sources; hence, any regulation change which impacts on NO_x emission rates must be considered carefully.

3.2.2 Power Plant Assessments

The three Indiana power plants in this region burn coal and gas. Existing regulations applied in 1975 would require all coal to be less than 1% S resulting in an emissions reduction of 169,000 tons per year compared to 1972

values (see Table C-2). Since rollback calculations indicate that a substantial emissions reduction is necessary (see Table A-8) and since 45% of the SO_2 emissions in the Indiana portion of the AQCR (or 24% of the total AQCR emissions) come from Indiana power plants (see Table A-7), there appears to be little chance for regulation relaxation. However, modeling results are not available and hence no quantitative plant-by-plant assessments were possible. Such an analysis might indicate the possibility of local relaxations.

Existing particulate regulations require no decrease in particulate emissions at these three plants (see Table C-2). Indiana power plants contribute only 3% (see Table A-6) of the Indiana portion of the emissions in the AQCR (or 1% of the total for the entire AQCR). However, rollback shows that a 92% reduction in particulate emissions may be required (see Table A-8). Despite the small overall contribution of the power plants, the large overall reduction required seems to allow no relaxation of particulate emission regulations in this sector.

3.2.3 Industrial/Commercial/Institutional Point Source Assessment

Eight industrial/commercial/institutional point sources are significant in this region by virtue of their contribution to the top 90% of the SO_2 and particulate emissions levels (Table A-5).

Percentages of sulfur in the oils burned by industrial, commercial, and institutional point sources were not available. It was assumed that all oil burned had 0.2% S, which is the state-wide average value for oil fired by utility power plants. Actual emission figures show that Indiana point sources contributed 17% of the total SO_2 emissions in the AQCR (Table A-7). A reduction of 530,000 tons per year in emissions is indicated by rollback calculations. Even considering the reduction of 169,000 tons per year required from power plants by present regulations, there remains a need for a further reduction of 361,000 tons per year in SO_2 emissions. Under the above assumption, present regulations would permit an increase in emissions from this sector of 134,000 tons per year (Table D-2), since most of the oil used could have higher than .2% sulfur. Given the required large reduction in emissions, the indications are that there is little margin for relaxation in the SO_2 regulations for these sources.

The same conclusions can be drawn about the particulate regulations. Indiana industrial sources contribute 95,000 tons per year to the regional particulate emission load (Table A-6). The required emission reduction of 610,000 tons per year leaves little room for relaxing particulate regulations for these sources.

3.2.4 Area Source Assessment

As shown on Tables A-6 and A-7, Indiana area sources are contributing 15,000 and 20,000 tons per year to the regional particulate and SO_2 emission rates respectively. Indiana regulations are not applied to these small individual sources. Table E-1 gives a fuel use summary.

3.2.5 Fuels Assessment

There is no modeling data available to determine the extent of potential clean fuels savings in this region on a plant-by-plant basis. Based on the regional analysis, there appears little tolerance for increased SO_2 emissions and hence little margin for a shift to higher sulfur content fuels. Similarly, the indications are that the increased particulate emissions resulting from a shift from oil to coal could not be tolerated in the region.

3.2.6 Overall Assessment

This region is a poor candidate for both SO_2 and particulate regulation relaxation as shown on Table 2-1. The regional air quality assessment shows no tolerance for emission increases and the source-specific assessments show no potential for clean fuels savings. In addition, there are both SO_2 and particulate AQMAs in the region indicating expected difficulties in attaining or maintaining acceptable air quality and thus supporting the poor candidacy assessment.

3.3 East Central Indiana Intrastate AQCR (#76)

3.3.1 Regional Air Quality Assessment

High particulate levels are being recorded at only one site in this region and hence may be a highly localized problem. More analysis is needed to determine whether the problem is general or local.

Low SO_2 levels are found in this region. There are also a low SO_2 emissions and rollback indicates that the region could absorb a significant emission increase (see Table A-8).

3.3.2 Power Plant Assessment

There is only one small power plant in this AQCR. Existing regulations require the use of moderate (1-2%) sulfur coal for an SO_2 emissions reduction of 4,400 tons per year in 1975 (see Table C-2). Even though 22% of the SO_2 emissions in the AQCR come from this plant (see Table A-7), the large permissable increase makes regulation relaxation appear feasible. (This statement is made subject to the limitations of available air quality and emissions data.) No local modeling results were available and thus no estimates of maximum allowable % S coal could be made.

On the other hand, little chance to relax the particulate regulations is indicated. Rollback shows that a reduction in emissions of 10,000 tons per year (see Table A-8) is necessary. The present regulations require a reduction of 420 tons per year from the power plant (see Table C-2) which contributes 4% of the total emissions in the AQCR (see Table A-6). Thus the plant is just meeting its proportionate share of the required emissions reduction indicating little chance of relaxing particulate regulations.

3.3.3 Industrial/Commercial/Institutional Point Source Assessment

Eight sources are significant in this region (see Table A-5).

All the sources are coal-fired and they contribute 28% of the total SO_2 loading for the region. A reduction in emissions of 2,000 tons per year is required under present regulations while a substantial increase might be tolerable according to the rollback calculations. Thus, the possibility of SO_2 emissions regulations relaxation exists. However, even the present regulations allow the burning of moderate (1-2%) and high (greater than 2%) sulfur coals in this AQCR and the practical results of regulation relaxation in terms of the utilization of higher sulfur fuels would be minimal.

There appears to be little chance for particulate regulation relaxation, since the region requires a 25% reduction in emissions (Table A-8), and these sources are contributing 12% to the regional emission load (Table A-6).

3.3.4 Area Source Assessment

Area fuel combustion sources are contributing 33% of the particulate emissions and 45% of the SO_2 emissions in the region (Tables A-6 and A-7). These small sources are not controlled by Indiana regulations and hence are not candidates for regulation relaxation.

3.3.5 Fuels Assessment

There are no modeling results to determine maximum allowable fuel sulfur contents for power plants and industrial/commercial/institutional sources. The previous analyses show that existing regulations are already permitting the use of high and moderate sulfur coals. As shown on Table F-1, only 208,000 tons of moderate sulfur coal is required while the remainder can be high sulfur. Therefore, any SO_2 regulation revision would have a nominal impact on clean fuels saving.

3.3.6 Overall Assessment

Given the existing particulate air quality, the indications are that the region is a poor candidate for relaxation of particulate emission regulations (see Table 2-1).

The indications based on air quality are that SO_2 emissions regulations could be relaxed. Although only nominal clean fuels saving potential exists in this region, it is a good candidate for regulation relaxation.

3.4 Evansville-Owensboro-Henderson Interstate AQCR (#77)

3.4.1 Regional Air Quality Assessment

This region is experiencing widespread high particulate levels. There is also a proposed particulate AQMA in this region and 68% of the particulate emissions come from Indiana fuel combustion sources. Thus, any regulation relaxation would have a significant impact on regional air quality.

Even though there are presently no known SO_2 problems, the high emission rate and the high percentage of SO_2 emissions (74%) from Indiana fuel combustion sources indicate that any regulation changes would have a large effect on air quality.

3.4.2 Power Plant Assessment

There are four large power plants and one small plant in the Indiana portion of this AQCR all of which are predominantly coal-fired. One large plant (Ohio River) is an oil-and gas-fired plant. In addition, the large (650 Mw capacity) coal-burning Gibson plant will begin operating in 1975. Present regulations require that all coal and oil be less than 1% sulfur

except at the small Jasper plant where coal with more than 2% sulfur could be burned. The application of the present regulations would result in a 217,000 tons per year decrease in emissions. Rollback indicates that SO_2 emissions in the region could increase by 432,000 tons per year. Modeling indicates that emissions could increase by 125,000 tons per year by the use of coals of 1-2% S and greater than 2% S at various plants (see Table C-1). (However, the large Warrick plant was not included in the modeling analysis.) Thus, indications are that an increase in SO_2 emissions could be allowed and emissions regulations relaxed.

An additional consideration that must be taken into account is that since power plants in Kentucky emit 24% of the SO_2 in this region (as compared to 42% for the Indiana plants), the effects of possible relaxations in Kentucky must also be evaluated.

Of the 81,000 tons per year of particulate emissions reduction required by rollback, only 5,000 tons per year will be obtained in 1975 from power plants under existing regulations, and these plants emit 36% of the particulates in the region. Thus, a reduction of about 76,000 tons per year must come from other sources and there appears little chance for relaxation of particulate emissions regulations for power plants.

3.4.3 Industrial/Commercial/Institutional Point Source Assessment

The two industrial sources here are coal-fired. (The ALCOA-Warrick power plant has been treated as a utility power plant.) These plants are significant sources, contributing 31% of the total SO_2 emissions in the AQCR. Present regulations require a small emissions reduction from this sector. Although rollback indicates that 432,000 tons per year of increased emissions are allowable (Table A-8) and thus makes the present regulations appear too restrictive there, the same considerations as were evidenced for the power plants apply here.

These sources are contributing 171,000 tons per year to be regional SO_2 emission rate (31% of the total, Table A-7) and any relaxation of regulations would have a significant impact on air quality. Additional study will be required to determine the feasibility of regulation changes for these sources.

No particulate regulation change is tolerable in this region.

3.4.4 Area Source Assessment

Indiana area sources are making only small contributions to the emission load in this region.

3.4.5 Fuels Assessment

As shown on Table F-1, the region has a significant potential for clean fuels savings through regulation modification based on the modeling results. Almost 8 million tons of low sulfur coal could be saved by relaxing the SO_2 emission standards. Because of this high clean fuels savings potential, it is imperative that a more thorough analysis be carried out to determine if, in fact, the fuel sulfur content increases indicated by the rollback and power plant modeling can be tolerated.

Shifts toward increased coal use in place of oil by power plants (Table C-1) would have to be dealt with cautiously because of the lack of tolerance for increased particulate emissions.

3.4.6 Overall Assessment

This region is a marginal candidate for SO_2 emission relaxation. Despite the apparently good SO_2 air quality, the large potential impact of regulation relaxation and the existence of a proposed AQMA indicate possible air quality maintenance problems. However, the large potential clean fuels savings indicates the desirability of a more detailed analysis of probable growth conditions to determine if, in fact, regulation relaxation could be possible. An alternative to region-wide regulation relaxation might be a selective granting of variances on a plant-by-plant basis after additional study.

With the particulate air quality problems and a proposed AQMA, the region is a poor candidate for particulate emission regulation relaxation.

3.5 Louisville Interstate AQCR (#78)

3.5.1 Regional Air Quality Assessment

This region has widespread high particulate levels which indicate that even though only 12% of the particulate emissions originate at Indiana fuel combustion sources, increased particulate emissions could not be tolerated.

Reported SO_2 air quality is good and a substantial capacity for absorbing increased SO_2 emissions is indicated.

3.5.2 Power Plant Assessment

There is only one power plant (Gallagher) in the Indiana portion of this AQCR. The plant burns mostly coal with a small amount of oil. Present regulations would require both fuels to contain less than 1% S. Compliance with these regulations would result in a reduction of 9,000 tons per year in SO_2 emissions. Results of rollback calculations indicate that an increase in emissions (Table A-8) is possible. Modeling of the plant showed no local problems even if 3.3% S coal were burned which fuel would result in almost no change over 1972 emissions. However, the Gallagher plant emits 65% of the SO_2 generated in the AQCR. Since the air quality impact of such a large source is great and since there is an AQMA in the Kentucky portion of the region, the apparent potential for emissions regulation relaxation indicated by modeling and rollback must be examined more closely with particular emphasis on the possible effects in Kentucky. There is, nevertheless, a definite possibility that such a relaxation could be effected.

The Gallagher plant is in compliance with the present particulate emissions regulations. Indications from rollback are that an AQCR-wide reduction of 207,000 tons per year in particulate emissions is necessary. Even though Gallagher accounts for less than 1% of the total particulate emissions, there appears to be little chance of particulate regulation relaxation.

3.5.3 Industrial/Commercial/Institutional Point Source Assessment

The only source in the Indiana portion of this AQCR is the Olin Ammo Plant which burns both coal and oil. The amount of oil firing is not large enough to make the assumption as to the % sulfur in the oil critical and the plant contributes only about 8% of the AQCR-wide SO_2 emissions. Present regulations require an emissions reduction of 6,700 tons per year from this plant but still allow between 1 and 2% S coal to be used. Rollback indicates that some 52,000 tons per year more SO_2 could be absorbed than is presently being emitted. Given the small overall impact of this source, it appears that regulations might be relaxed. However, the same precautions must be taken as for the Gallagher power plant.

No particulate regulation relaxation is possible.

3.5.4 Area Source Assessment

Tables A-6 and A-7 show that area sources are contributing small amounts to the regional SO_2 and particulate emission rates. A fuel use summary is in Table E-1.

3.5.5 Fuels Assessment

Table F-1 shows that almost 1.7 million tons of low sulfur coal could be conserved through SO_2 regulation modification based on modeling results.

3.5.6 Overall Assessment

The proposed AQMA in Kentucky makes this region a marginal candiate for SO_2 emissions regulation relaxation. The large potential for clean fuels savings makes it imperative that the NAAQS maintenance issue be resolved to determine if regulation relaxation could be implemented.

The region is a poor candidate for particulate emission regulation relaxation because of the poor particulate air quality.

3.6 Metropolitan Cincinnati Interstate AQCR (#79)

3.6.1 Regional Air Quality Assessment

There are widespread high particulate levels in this region and no indicated tolerance for an increase in regional emissions rates.

The current SO_2 emissions rate in this region is very high (479,000 tons/year, Table B-2), and a substantial portion (38%) of the emissions come from Indiana fuel combustion sources. There are, however, no indications of high ambient SO_2 levels. Regional air quality must be carefully assessed before widespread regulation relaxation can take place.

3.6.2 Power Plant Assessment

There is only one large predominantly coal-fired power plant (Tanners Creek) in the Indiana portion of this AQCR. Present regulations call for burning coal with less than 1% S at the plant by 1975 with a concomitant decrease in SO_2 emissions of 150,000 tons per year. Rollback indicates a capacity to absorb

an increase of 216,000 tons per year. Modeling results show that virtually no increase in fuel sulfur content is allowable (Table C-1). The required emission reduction appears overly restrictive in terms of the rollback calculations, but it must be considered in light of the constraint of the local situation as determined by modeling which indicates little chance of using higher sulfur fuels. There appears, therefore, to be no margin for SO_2 regulation relaxation for this plant.

For particulates the conclusion is similar. Present regulations would result in a 30,000 tons per year decrease in particulate emissions while rollback shows a need for a reduction of 207,000 tons per year. Since the plant emits 18% of the particulate matter in the AQCR, there is a large residual reduction that must come from other sources. No relaxation of the regulations appears possible.

3.6.3 Industrial/Commercial/Institutional Point Source Assessment

The Jos. E. Seagram plant is the only significant Indiana industrial source in this AQCR and it uses coal. Present regulations would require this source which emits only 1% of the SO_2 in the AQCR to burn 1.7% sulfur coal and reduce emissions by 2,700 tons per year by 1975. A capacity for a large increase in SO_2 emissions is indicated by rollback (Table A-8). Given the small contribution of this plant, it appears that the chances are good for emissions regulation relaxation although clean fuel savings would be small.

There is no margin for particulate regulation relaxation for this source.

3.6.4 Area Source Assessment

Indiana area sources contribute only 1,000 tons each of particulates and SO_2 and hence are not now major considerations in regional air quality problems.

3.6.5 Fuels Assessment

Based on the modeling results and regional assessment, there is little potential for clean fuels savings in this region.

3.6.6 Overall Assessment

Although indications from air quality are favorable, local modeling results show little potential for power plant regulation relaxation. Also, there is

no significant potential for clean fuels savings. Thus, this region is a poor candidate for SO_2 regulation relaxation.

Based on air quality, the indications are that this region is a poor candidate for particulate emission regulation relaxation. This conclusion is strengthened by the proposed TSP AQMA in the Ohio portion of the region.

3.7 Metropolitan Indianapolis Intrastate AQCR (#80)

3.7.1 Regional Air Quality Assessment

Particulate problems exist at several locations in the region. Fuel combustion accounts for 79% of the particulate emission load and hence regulation relocation would significantly impact upon regional air quality.

There are no reported SO_2 problems but fully 95% of the emissions come from fuel combustion sources indicating that changes in regulations must be considered carefully.

3.7.2 Power Plant Assessment

Three of the four power plants in this AQCR are coal-and oil-fired and one is coal-fired only. Rollback calculations indicate that an additional 123,000 tons per year of emissions could be absorbed. Modeling results also show that 40,000 tons per year of increased emissions are allowable locally and that coal with greater than 2% S could be burned at all plants except E. W. Stout. The existing regulations require all coal to be less than 1% S and would produce a decrease in SO_2 emissions of 28,000 tons per year. Thus, the rollback and modeling results both indicate that the SO_2 emissions regulations could be relaxed. Since fully 61% of the SO_2 emissions in this AQCR come from power plants, any change in SO_2 emissions regulations will have a significant impact on ambient air quality. Since there is a proposed SO_2 AQMA in the region indicating a potential maintenance problem, regulation relaxation cannot be recommended until the possible effects of such relaxation on the AQMA have been analyzed.

For particulates, rollback indicates that an emission reduction of 37,000 tons per year is necessary. Present regulations should result in a reduction of 26,000 tons per year from power plants which account for 38% of the particulate emissions. Since even this anticipated emissions reduction from

the power plants under existing regulations does not give the required reduction, there does not appear to be a good chance of allowing regulation relaxation.

3.7.3 Industrial/Commercial/Institutional Point Source Assessment

Several Indiana sources in this AQCR burn significant amounts of oil. It was assumed that all oil was 0.3% S which is the average value for all utility power plants in the Indiana portion of the AQCR. Under this assumption, present regulations would allow an increase of 1,700 tons per year in SO_2 emissions. Rollback indicates a sufficient capacity to absorb this increase, showing that 123,000 tons per year more SO_2 could be tolerated than is presently being emitted. Nevertheless, the same maintenance constraints which prohibit a recommendation to relax SO_2 emission limits for power plants apply here also.

Particulate regulation relaxation is not possible, since the region cannot tolerate increased emissions.

3.7.4 Area Source Assessment

Area sources are contributing significant quantities to the particulate and SO_2 emission rates in the region (20,000 and 31,000 tons per year respectively, Tables A-6 and A-7). Indiana regulations are not applied to these small sources. Table E-1 gives a fuel use summary.

3.7.5 Fuels Assessment

Table F-1 shows that almost 3 million tons of low sulfur coal could be conserved by modifying the SO_2 regulations based on the modeling results. It is therefore imperative that the maintenance issue be resolved to determine if, in fact, the margin for SO_2 emission increase displayed by the rollback and power plant modeling can be utilized for clean fuel conservation.

3.7.6 Overall Assessment

Despite the indications of acceptable SO_2 air quality and the potential for significant clean fuels saving, the possibility of maintenance problems as discussed above make this region a marginal candidate for SO_2 emission regulation relaxation.

Indications of particulate air quality problems make this region a poor candidate for particulate emission regulation relaxation. This conclusion is supported by the potential air quality problems indicated by a proposed TSP AQMA in the region.

3.8 Northeast Indiana Intrastate AQCR (#81)

3.8.1 Regional Air Quality Assessment

This region has the lowest particulate emissions rate in the state. However, the number of stations in the region may be insufficient to assess air quality and no annual data is available. The two stations reporting show no short-term particulate problems. The indications are that there is a tolerance for increased particulate emissions.

There are currently no SO_2 air quality problems, but since 93% of the region's SO_2 emissions come from stationary source fuel combustion, any relaxation of fuel combustion regulations would have a substantial impact on regional air quality.

3.8.2 Power Plant Assessment

This AQCR contains only one relatively small coal-fired power plant which contributes 5% of the total SO_2 emissions in the region. Present regulations require 1-2% S coal and a reduction in emissions of about 780 tons per year. Rollback results indicate that substantial emission increases could be tolerated. Thus, the indications are that the regulations could be relaxed in favor of higher sulfur coal use even though no modeling results are available.

Present particulate regulations require a decrease in the power plant emissions by 2,000 tons per year while rollback indicates that a small emission increase could be tolerated. The regulations appear to be overly restrictive in this situation and might be relaxed in the interest of allowing the plant to continue to burn coal instead of lower particulate producing oil or gas.

3.8.3 Industrial/Commercial/Institutional Point Source Assessment

All three of the sources in this region burn coal. Present regulations already permit coal with more than 2% S to be burned at some installations and

require no coal less than 1% S. Even with these moderate restrictions, emissions would decrease by 2,800 tons per year by 1975. Since rollback indicates that an emissions increase of 416,000 tons per year is tolerable, the regulations might be relaxed in favor of wider use of high sulfur coal. That the three sources in the region account for fully 33% of the SO_2 emissions indicates that any proposed relaxation must adequately consider the potential of creating a local SO_2 problem. No modeling results were available to make this determination.

As with the power plant, it appears that particulate regulations could also be relaxed in this region to encourage these facilities to continue coal use.

3.8.4 Area Source Assessment

Area sources are significant contributors to the particulate and SO_2 emissions in this region (see Tables A-6 and A-7). Indiana regulations are not applied to these small sources. Table E-1 gives a fuel use summary.

3.8.5 Fuels Analysis

Although the region is a good candidate for regulation relaxation based on air quality considerations, the potential clean fuels savings is minimal as shown on Table F-1 (only 116,000 tons of moderate sulfur coal). The chief advantage of a relaxation would be to prevent an increase in the demand for clean fuels over existing levels.

3.8.6 Overall Assessment

There are indications that this region is a good candidate for SO_2 emission regulation relaxation, but any relaxation has a potentially large effect on air quality and must be considered carefully.

Since the TSP air quality data is not complete but still indicates little tolerance for increased emissions, this region is a marginal candidate for particulate emission regulation relaxation.

3.9 South Bend-Elkhart-Benton Harbor Interstate AQCR (#82)

3.9.1 Regional Air Quality Assessment

There are indications of poor particulate air quality in this region. Although overall particulate emissions are low, a predominant share (78%) comes from Indiana fuel combustion sources and hence they have a significant impact on air quality. SO_2 air quality appears good with a substantial tolerance to absorb increased emissions. This capacity is important, since 90% of the region's emissions come from Indiana fuel combustion sources.

3.9.2 Power Plant Assessment

There are two power plants in the Indiana portion of this AQCR and both use coal as their major fuel. Present regulations would require a reduction of almost 15,000 tons per year in SO_2 emissions by 1975, and the burning of coal with less than 1% sulfur. However, rollback based on existing air quality data indicates that an increase of 36,000 tons per year over present emissions could be tolerated. Local modeling results also show that emissions could increase by about 36,000 tons per year and that some coal with more than 2% S could be burned. Present regulations may thus be overly restrictive and this AQCR is a good candidate for SO_2 emission regulation relaxation for power plants.

Indications are that the region is a poor candidate for particulate emission regulation relaxation. Present regulations could result in a decrease of 33,000 tons per year in particulate matter emissions. Rollback calculations show the need for a reduction of 37,000 tons per year leaving a deficit of 4,000 tons per year to come from reductions at sources other than power plants. The power plants are a significant source of particulate matter accounting for 62% of the Indiana emissions and 54% of the AQCR total. Thus, there are no indications that the particulate emissions regulations can be relaxed.

3.9.3 Industrial/Commercial/Institutional Point Source Assessment

For this AQCR, it was assumed that the oil burned was of 0.1% sulfur. If this assumption is far from the actual situation, the conclusions presented here are still substantially correct because the % S in the oil has only a

small effect on the overall figures. Present regulations require a reduction of 460 tons per year in SO_2 emissions but still allow coal with more than 2% S to be burned. Rollback shows that emissions increases up to 36,000 tons per year are permissable. Since Indiana sources in this sector contribute only about 10% of the total SO_2 emissions in the AQCR, the SO_2 emissions regulations might be relaxed to permit higher fuel sulfur contents.

The particulate regulations from these sources cannot be relaxed, since the region cannot tolerate any emission increases.

3.9.4 Area Source Assessment

Indiana area sources are contributing significant quantities to the regional particulate and SO_2 emission loads. Indiana regulations are not applied to these sources. No change appears necessary for the SO_2 regulations. Table E-1 gives a fuel use summary.

3.9.5 Fuels Assessment

Table F-1 shows that 2.4 million tons of low sulfur coal could be conserved through SO_2 regulation relaxation. Most of this would be shifted only to a moderate sulfur content, but the savings are still substantial. It was not possible to determine how much of the oil and gas used could be replaced by coal, but it appears that significant savings could be achieved both from the air quality standpoint and from technological considerations (all of the facilities burning oil and gas have coal-burning capability also). The resulting increase in particulate emissions from such conversions, however, might have to be countered by tighter particulate emission limits. Overall, the region has good clean fuels savings potential.

3.9.6 Overall Assessment

Indications are that this region is a good candidate for SO_2 emission regulation relaxation even though the air quality impact of any such relaxation could be substantial. Only the 1A SO_2 priority classification gives cause for concern; there may be local, single-source problems that need further study before any general relaxation can be justified.

This region is a poor candidate for particulate regulation relaxation both because of poor particulate air quality and because of the potential impact of regulation relaxation on air quality.

3.10 Southern Indiana Intrastate AQCR (#83)

3.10.1 Regional Air Quality Assessment

One station in this AQCR is reporting high TSP levels. Since there are no proposed AQMAs and since total emissions are low, this may indicate a highly localized problem. The need for more study is indicated.

Although the emission rate is moderately high, the SO_2 air quality appears good and rollback indicates a substantial capacity to absorb increased SO_2 emissions.

3.10.2 Power Plant Assessment

There is one large coal-fired power plant, Clifty Creek, in this AQCR. Compliance coal under present regulations must contain less than 1% S and firing such coal would cause an emissions reduction of 226,000 tons per year. Rollback estimates indicate that an additional 983,000 tons per year of SO_2 might be safely emitted in this AQCR. Local modeling results show that coal of more than 2% S could be utilized and still result in a 3,900 tons per year emissions reduction. These results indicate that there is a good possibility for SO_2 emissions regulation relaxation. However, the power plant accounts for fully 89% of the total SO_2 emissions in this AQCR and hence any regulation relaxation must be carefully scrutinized especially as to possible local short-term standards violations.

The Clifty Creek plant is presently in compliance with SIP particulate regulations. However, rollback calculations still show that reduction of 12,000 tons per year in particulate matter emissions must take place in order to meet the NAAQS. Since the power plant contributes 25% of the total emissions, there seems little chance of relaxing particulate emission regulations.

3.10.3 Industrial/Commercial/Institutional Point Source Assessment

Only coal is burned by the three sources in this AQCR. Moderate and high sulfur coals can be burned under present regulations which require an emissions reduction of 4,500 tons per year. Rollback calculations yield a capacity for a large increase in SO_2 emissions (see Table A-8). Given this required emissions decrease with such a large emission increase tolerance and given that these sources contribute only 4% of the SO_2 in the AQCR, it may be possible to relax the regulations.

The particulate regulations have no margin for relaxation. There is a TSP problem and rollback indicates no tolerance for a particulate emission increase.

3.10.4 Area Source Assessment

Area fuel combustion sources are contributing more to the regional SO_2 and particulate emission load than are the industrial sources (see Tables A-6 and A-7). There is probably no need for additional SO_2 control from these sources, since rollback indicates that the region can absorb increased SO_2 emissions. Table E-1 gives a fuel use summary.

3.10.5 Fuels Assessment

Table F-1 shows that almost 4 million tons of low sulfur coal could be saved through regulation relaxation. This would come primarily from allowing the Clifty Creek plant to increase its coal sulfur content. Since all the facilities are now using coal, there would be little impact on particulate emission rates.

3.10.6 Overall Assessment

This region is classified Priority 1A for both SO_2 and TSP indicating local single-source problems. In addition, the poor particulate air quality and large potential impact of relaxed regulations make this region a poor candidate for particulate emission regulation relaxation.

Even though relaxed regulations are likely to have a significant impact on air quality, the region has a significant tolerance for increased SO_2 emissions and is a good candidate for regulation relaxation if the local single-source problem indicated by the IA priority is carefully analyzed.

3.11 Wabash Valley Intrastate AQCR (#84)

3.11.1 Regional Air Quality Assessment

Indications are that particulate air quality might be poor although only one station is reporting violations. The effects of any proposed revision would be widespread, since 78% of particulate emissions come from fuel combustion sources and thus need to be carefully considered.

Although there are only few SO_2 monitoring sites in the region, there are no indications of high SO_2 levels. However, fuel combustion sources are generating 99% of all SO_2 emissions and hence have a significant impact on air quality.

3.11.2 Power Plant Assessment

There are three large (above 100 Mw capacity) and six small, predominantly coal-fired power plants in this AQCR. In addition, the large coal-fired Schahfer plant is scheduled to come on-line in 1975. Assuming that the Schahfer plant just meets the present requirements, these regulations would require an emissions reduction of 147,000 tons per year by 1975 and the firing of coal and oil with less than 1% S except for a small quantity of 1-2% S coal that could be fired at several of the smaller plants. Rollback indicates that SO_2 emissions could be increased by a large amount. Modeling results for the large plants show that some coals above 2% S could be utilized with almost no change in SO_2 emissions and no local air quality problems. However, the modeling studies were not done for the new Schahfer plant or for the smaller plants. The power plants have a large impact, since they account for 81% of the total SO_2 emissions in the AQCR. Thus, although both rollback and local modeling indicate that present emissions regulations might be relaxed, further study is necessary to decide if such relaxation is possible.

Rollback for particulates shows the need for a reduction in emissions of 28,000 tons per year. Meeting present regulations would result in a reduction of only 300 tons per year from power plants assuming that the Schahfer plant meets the present emission limits. The power plants presently emit 58% of the particulate matter in the AQCR and will probably account for a larger proportion by 1975 when the new plant begins operating. Given the large

emission reduction necessary and the small fraction of that reduction to be obtained from the power plants which are major sources, there appears little chance of relaxing the particulate matter emissions regulations.

3.11.3 Industrial/Commercial/Institutional Point Source Assessment

The six sources in this AQCR burn coal. Present regulations can be met with coals in the 1-2% S range and would produce a decrease in SO_2 emissions of 9,000 tons per year. There is capacity for 759,000 tons per year of increased emissions based on rollback. These results show that this AQCR may be a good candidate for SO_2 emissions regulation relaxation. The same cautions as were evidenced in the power plant analysis apply here in that regulation relaxation may detrimentally impact on NAAQS maintenance.

There is no room for particulate regulation relaxation because of current particulate air quality problems.

3.11.4 Area Source Assessment

Area sources are contributing significant amounts to regional emission loads although not more than 10% (see Tables A-6 and A-7). Indiana regulations are not applied to these small sources. Table E-1 gives a fuel use summary.

3.11.5 Fuels Assessment

Table F-1 shows that almost 8 million tons of low sulfur coal could be conserved through regulation relaxation with about half of this being replaced by moderate sulfur and the rest by high sulfur coal. Since the potential fuel savings are significant, it is imperative that possible maintenance issues be resolved prior to regulation relaxation.

3.11.6 Overall Assessment

Indications of poor particulate air quality with no overall tolerance for emissions increases and the substantial impact of combustion source emissions on air quality make this region a poor candidate for particulate emission regulation relaxation.

Even though there is a significant clean fuel saving potential, the large impact of combustion sources on regional air quality and the insufficient SO_2 air quality data base make this region a marginal candidate for SO_2 emission regulation relaxation.

APPENDIX A

State Implementation Plan Background

TABLE A-1. Indiana Air Pollution Control Areas

Air Quality Control Region	Federal Number	Demographic Information			Priority Classification			Proposed AQMA Designations[a]	
		Population 1970 (Millions)	Area (Square Miles)	Population Per Square Mile	Particulates	SO_x	NO_x	TSP Counties	SO_x Counties
Chicago (Ill.)	67	7.78	6087	1278	I	I	I	(2) Lake, Porter	(2) Lake Porter
East Central Indiana	76	.55	3085	179	II	II	III	(0)	(0)
Evansville-Owensboro-Henderson (Ky.)	77	.51	5704	89	I	II	III	(1) Vanderburgh	(1) Vanderburgh
Louisville (Ky.)	78	.83	908	912	I	I	III	(0)	(0)
Cincinnati (Ky., Ohio)	79	1.66	3816	435	I	II	III	(0)	(0)
Indianapolis	80	1.11	3072	362	I	I	III	(1) Marion	(1) Marion
Northeast Indiana	81	.49	3558	139	II	III	III	(0)	(0)
South Bend-Elkhart-Benton Harbor (Mich.)	82	.83	4198	197	I	IA	III	(0)	(0)
Southern Indiana	83	.55	8667	63	IA	IA	III	(0)	(0)
Wabash Valley	84	.81	10239	79	I	I	III	(0)	(0)

[a]As of November 14, 1974

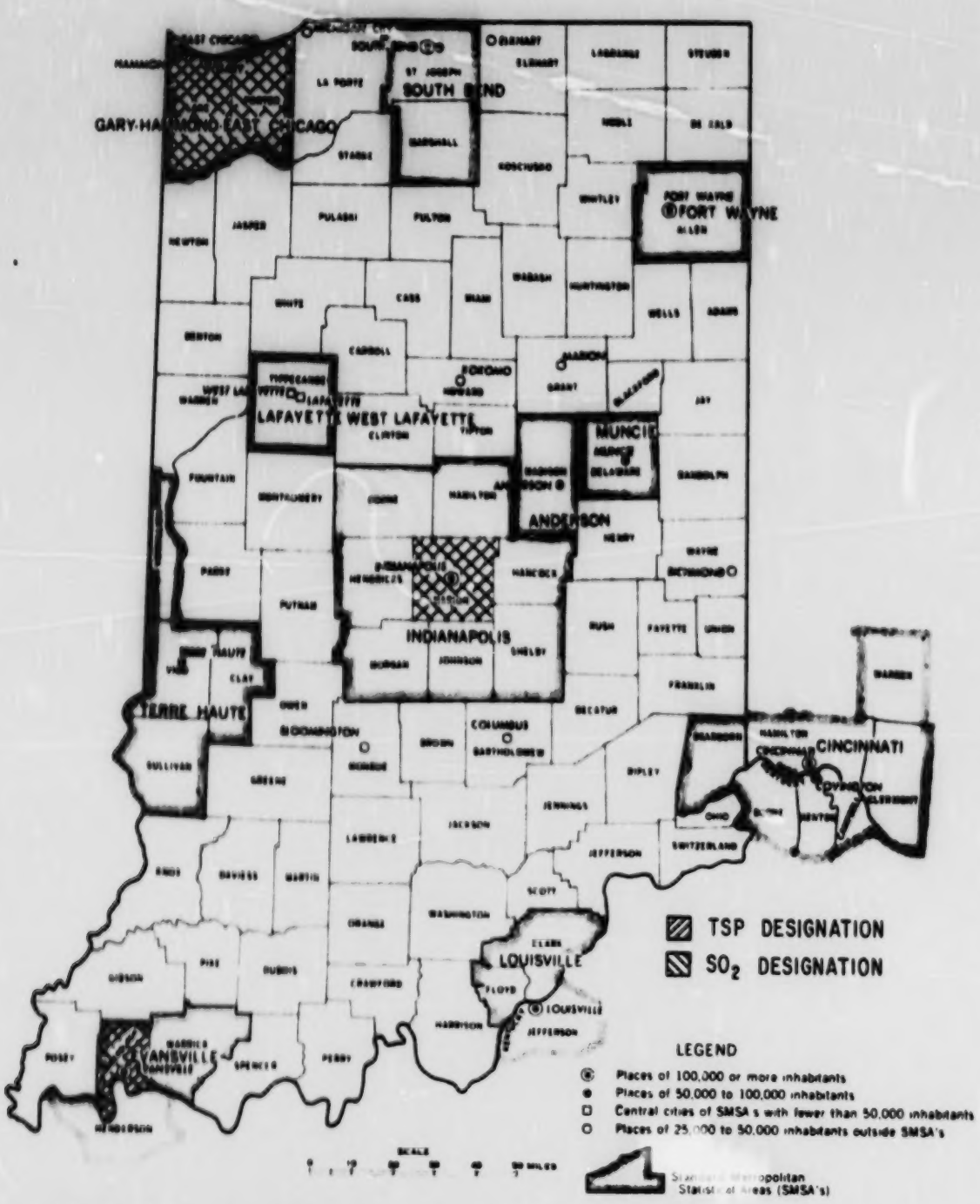

Figure A-1. Proposed Indiana Air Quality Maintenance Areas (AQMA)

TABLE A-2. Indiana Ambient Air Quality Standards

All concentrations in $\mu gms/m^3$

		Total Suspended Particulate		Sulfur Oxides				Nitrogen Dioxide
		Annual	24-Hour	Annual	24-Hour	3-Hour	1-Hour	Annual
Federal	Primary	75(G)	260[a]	80(A)	365[a]	---	---	100(A)
	Secondary	60(G)	150[a]	---	---	1300[a]	---	100(A)
State	Primary	75(G)	260[a]	80(A)	365[a]	---	---	100(A)
	Secondary	60(G)	150[a]	60(A)	260[a]	---	1100[a]	100(A)

[a]Not to be exceeded more than once per year.

(A) Arithmetic mean
(G) Geometric mean

TABLE A-3 Indiana AQCR Air Quality Status, TSP[a]

AQCR No.	No. Stations Reporting	TSP Concentration (ugm/m^3)			Number of Stations Exceeding Ambient Air Quality Standards						% Reduction Required to Meet Standards[d]	Controlling Standard
		Highest Reading		2nd Highest Reading	Primary		Secondary					
		Annual	24-Hr	24-Hr	Annual	24-Hr[c]	Annual	%	24-Hr[c]	%		
67[b]	93	164	888	611	34	15	50	54	55	59	+ 92	Annual
76	7	70	165	136	0	0	1	14	0	0	+ 25	Annual
77[b]	27	144	398	270	7	1	13	48	11	41	+ 76	Annual
78[b]	21	162	514	437	6	3	8	38	12	57	+ 79	Annual
79[b]	55	166	450	351	9	2	32	58	14	25	+ 80	Annual
80	22	70	284	253	0	0	1	5	9	41	+ 47	24-Hr
81	2	-	141	129	-	0	-	-	0	0	- 21	24-Hr
82[b]	18	89	244	206	2	0	4	22	4	22	+ 52	Annual
83	4	45	189	182	0	0	0	0	1	25	+ 21	24-Hr
84	16	67	285	130	0	0	1	6	0	0	+ 21	Annual

[a]1973 air quality data in National Air Data Bank as of June 7, 1974.

[b]Interstate

[c]Violations based on 2nd highest reading at any station.

[d]Formula:

$$\left[\left(\frac{\text{2nd Highest 24-Hr - 24-Hr Secondary Standard}}{\text{2nd Highest 24-Hr. - Background}}\right) \times 100, \quad \left(\frac{\text{Annual - Annual Secondary Standard}}{\text{Annual - Background}}\right) \times 100\right]$$

Background (ugm/m^3): 50.7 for AQCR 67
33.0 for AQCRs 77, 78, 79, 80, 82, 84
30.0 for AQCRs 76, 81, 83

TABLE A-4. Indiana AQCR Air Quality Status, SO_2[a]

AQCR No.	No. Stations Reporting		SO_2 Concentration ($\mu gm/m^3$)			Number of Stations Exceeding Ambient Air Quality Standards			% Reduction Required to Meet Standards[d]	Controlling Standard
			Highest Reading		2nd Highest Reading	Primary		Secondary		
	24-Hr	Cont.	Annual	24-Hr	24-Hr	Annual	24-Hr[c]	3-Hr[c]		
67[b]	76	24	147	583	275	3	1	0	+ 46	Annual
76	6	-	-	96	86	0	0	-	- 324	24-Hr
--[b]	20	5	39	267	205	0	0	0	- 78	24-Hr
78[b]	21	8	61	419	211	0	0	0	- 31	Annual
79[b]	32	3	55	203	141	0	0	0	- 45	Annual
80	12	-	48	225	133	0	0	-	- 67	Annual
81	2	-	-	32	23	0	0	-	- 1487	24-Hr
82[b]	5	-	14	382	259	0	0		- 41	24-Hr
83	4	-	-	125	78	0	0	-	- 368	24-Hr
84	5	-	-	170	110	0	0	-	- 232	24-Hr

[a] 1973 air quality data in National Air Data Bank as of June 7, 1974.

[b] Interstate

[c] Violations based on 2nd highest reading at any station.

[d] Formula:

$$\left[\left(\frac{\text{2nd Highest 24-Hr - 24-Hr Standard}}{\text{2nd Highest 24-Hr}} \times 100,\right) \left(\frac{\text{Annual - Annual Standard}}{\text{Annual}}\right) \times 100\right]$$

Table A-5. Indiana Fuel Combustion Source Summary

AQCR No.	Power Plants[a]	Other Fuel Combustion Point Sources[b]	Area Sources[c]	Total Emissions[d] (10^3 tons/year) TSP	Total Emissions[d] (10^3 tons/year) SO_2	% Emissions from Indiana Fuel Combustion Sources TSP	% Emissions from Indiana Fuel Combustion Sources SO_2
67[e]	3	8	2	663	1152	18	43
76	1	8	8	41	41	49	95
77[e]	6[f]	3	8	107	554	68	74
78[e]	1	1	2	271	168	12	76
79[e]	1	1	2	259	479	20	35
80	4	14	8	78	183	79	95
81	1	3	9	27	28	55	93
82[e]	2	2	5	72	87	78	90
83	1	3	23	55	267	49	99
84	9[f]	6	25	132	327	78	99
Total	29	49	92	1704	3287	33	71

[a] Indiana plants

[b] Indiana plants contributing 90% of the particulate and SO_2 emissions

[c] Indiana counties

[d] AQCR total

[e] Interstate

[f] Additional plant scheduled for 1975

TABLE A-6 Indiana Emissions Summary[a], TSP

AQCR		Total (10^3 tons/yr)	%	Electricity Generation (10^3 tons/yr)	%	Industrial/Commerical/ Institutional Point Source (10^3 tons/yr)	%	Area Source (10^3 tons/yr)	%
67	Indiana	255	15	7	3	95	37	15	6
	Other	408	24	6	2	30	7	120	29
	Total	663	39	14	2	124	19	135	20
76		41	2	2	4	5	12	13	33
77	Indiana	80	5	38	47	29	36	6	7
	Other	26	1	4	14	1	5	3	11
	Total	107	6	42	39	30	28	9	8
78	Indiana	42	3	2	5	28	67	3	7
	Other	228	13	0	0	5	2	14	6
	Total	271	16	2	1	33	12	17	6
79	Indiana	51	3	47	92	3	5	1	1
	Other	208	12	76	37	37	18	50	24
	Total	259	15	123	16	39	15	51	20
80		78	5	30	38	12	15	20	26
81		27	2	2	8	3	10	10	37
82	Indiana	63	3	39	62	4	6	13	21
	Other	9	1	0	0	.3	4	3	39
	Total	72	4	39	54	4	5	16	23
83		55	3	14	25	3	6	10	18
84		132	8	77	58	13	10	13	10
Total		1704	100	343	20	267	16	296	17

[a]Emissions in Data Bank as of June 27, 1974.

TABLE A-7 Indiana Emissions Summary[a], SO_2

AQCR		Total (10^3 tons/yr)	%	Electricity Generation (10^3 tons/yr)	%	Industrial/Commercial/ Institutional Point Source (10^3 tons/yr)	%	Area Source (10^3 tons/yr)	%
67	Indiana	622	19	279	45	193	31	20	3
	Other	530	16	192	36	308	58	225	42
	Total	1152	35	471	41	501	43	245	21
76		41	1	9	22	12	28	19	45
77	Indiana	413	13	231	56	171	41	10	2
	Other	141	4	133	94	1	1	6	4
	Total	554	17	364	66	172	31	16	3
78	Indiana	128	4	110	85	13	10	4	3
	Other	40	1	0	0	18	46	19	48
	Total	168	5	110	65	31	19	23	14
79	Indiana	171	5	164	96	5	3	1	1
	Other	308	9	232	75	28	9	26	8
	Total	479	14	396	83	33	7	27	6
80		183	6	112	61	31	17	31	17
81		28	1	1	5	9	33	15	55
82	Indiana	80	2	51	64	9	11	18	23
	Other	7	0	0	0	.7	10	5	74
	Total	87	2	51	59	9	11	24	27
83		267	8	237	89	12	4	17	6
84		327	10	263	81	35	11	23	7
Total		3287	100	2015	61	846	35	438	13

[a]Emissions in Data Bank as of June 27, 1974

TABLE A-8. Indiana AQCR Required Emission Reduction[a]

AQCR	Required Particulate Emission Reduction		Required SO_2 Emission Reduction	
	%	10^3 tons/year	%	10^3 tons/year
67[b]	+92	+610	+ 46	+530
76	+25	+ 10	- 324	-133
77[b]	+76	+ 81	- 78	-432
78[b]	+78	+211	- 31	- 52
79[b]	+80	+207	- 45	-216
80	+47	+ 37	- 67	-123
81	- 8	- 21	-1487	-416
82[b]	+52	+ 37	- 41	- 36
83	+21	+ 12	- 368	-983
84	+21	+ 28	- 232	-759

[a] Based on a proportional change of emissions to air quality.

[b] Interstate

Table A-9. Indiana Fuel Combustion Emission Regulations

Existing Facilities		New Facilities	
		≤ 250 x 10^6 Btu/hr	> 250 x 10^6 Btu/hr
Particulates			
In all areas except Lake and Porter Counties (#67), and in the Metropolitan Indianapolis AQCR (#80)	Maximum ground level concentration of 50 μgms/m^3 for ½ - 1 hour average limited by a maximum emission rate of .8 lbs/10^6 Btu	Maximum ground level concentration of 50 μgms/m^3 for ½ - 1 hour average limited by a maximum emission rate of .6 lbs/10^6 Btu	.1 lbs/10^6 Btu
In Lake and Porter Counties and in the Metropolitan Indianapolis AQCR	Limit determined by Fig. A-2.	Limit determined by Fig. A-2.	.1 lbs/10^6 Btu
Existing Facilities		New Facilities	
		≤ 250 x 10^6 Btu/hr	> 250 x 10^6 Btu/hr
SO_2	Smaller of the emission rates as determined by (a) maximum ground level concentration of 200 μgms/m^3 or (b) Fig. A-3.	Same as for existing facilities.	Federal New Source Performance Standards .8 lbs/10^6 Btu for liquid fuel 1.2 lbs/10^6 Btu for solid fuel

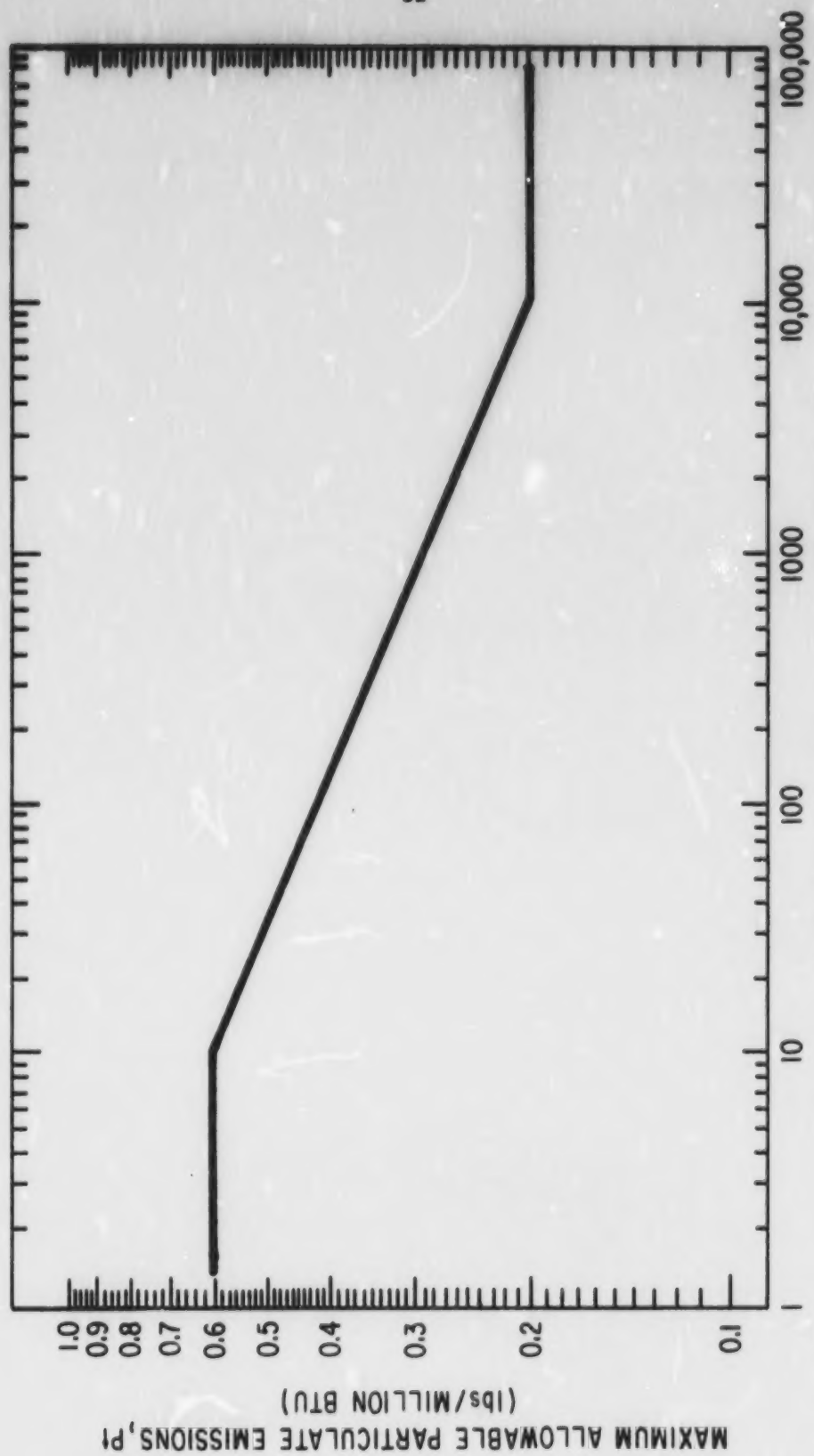

Figure A-2. Indiana Particulate Emission Limits

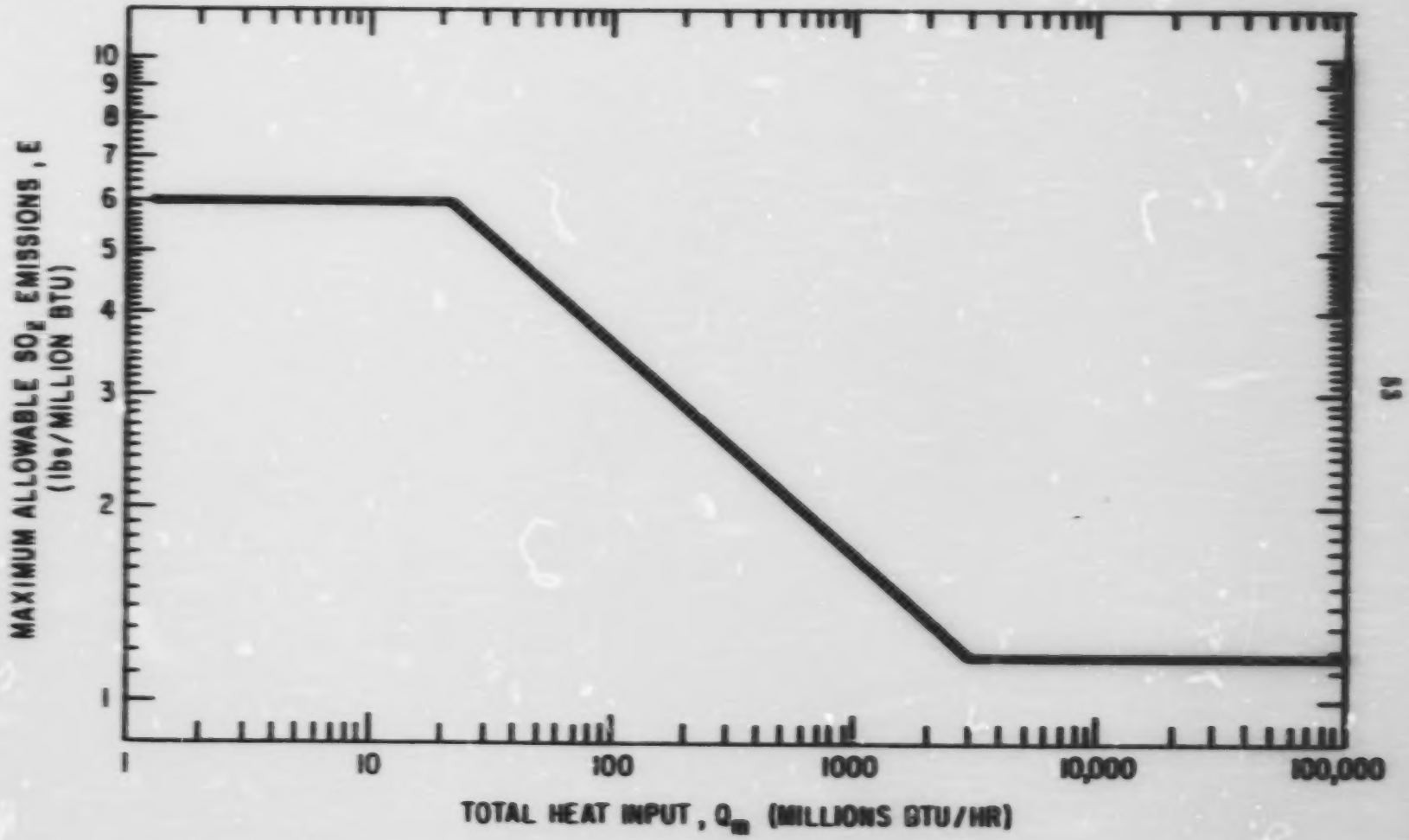

Figure A-3. Indiana SO_2 Emission Limits

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APPENDIX B

Regional Air Quality Assessment

Table B-1. Indiana AQCR Candidacy Assessment for Particulate Regulation Relaxation

Air Quality Control Region	Federal Number	Stations with Particulate Air Quality Violations	Expected Attainment Date	Number of Counties with Proposed AQMA Designations	Total Particulate Emissions (10^3 tons/yr)	% Emissions from Indiana Fuel Combustion	Emission Reduction Required for NAAQS (10^3 tons/yr)	Particulate Priority
Chicago (Ill.)	67	60	1/77	2	663	18	+610	1
East Central Indiana	76	1	7/75	0	41	49	+ 10	2
Evansville (Ky.)	77	16	7/75	1	107	68	+ 81	1
Louisville (Ky.)	78	14	7/75	0	271	12	+211	1
Cincinnati (Ky., Ohio)	79	34	7/75	0	259	20	+207	1
Indianapolis	80	9	7/75	1	78	79	+ 37	1
Northeast Indiana	81	0	-	0	27	55	- 21	2
South Bend (Mich.)	82	4	7/75	0	72	78	+ 37	1
Southern Indiana	83	1	7/75	0	55	49	+ 12	1A
Wabash Valley	84	1	7/75	0	132	78	+ 28	1

Table B-2. Indiana AQCR Candidacy Assessment for SO_2 Regulation Relaxation

Air Quality Control Region	Federal Number	Stations with SO_2 Air Quality Violations	Expected Attainment Date	Number of Counties with Proposed AQMA Designations	Total SO_2 Emissions (10^3 tons/yr)	% Emissions from Indiana Fuel Combustion	Emission Reduction Required for NAAQS (10^3 tons/yr)	SO_2 Priority
Chicago (Ill.)	67	4	1/77	2	1152	43	+530	1
East Central Indiana	76	0	-	0	41	95	-133	2
Evansville (Ky.)	77	0	-	1	554	74	-432	2
Louisville (Ky.)	78	0	-	0	168	76	- 52	1
Cincinnati (Ky., Ohio)	79	0	-	0	479	35	-216	2
Indianapolis	80	0	-	1	183	95	-123	1
Northeast Indiana	81	0	-	0	28	93	-416	3
South Bend (Mich.)	82	0	-	0	87	90	- 36	1A
Southern Indiana	83	0	-	0	267	99	-983	1A
Wabash Valley	84	0	-	0	327	99	-759	1

Pages 58 and 59 are B Plant.

Table C-1. Indiana Power Plant Assessment

AQCR	Plant	1975 Capacity (Mw)	Estimated 1975 Fuel Use		% S Under SIP Regulations[b]	% S Allowed by Model[c]
			Fuel	Quantity[a]		
67[e]	State Line	972.0	Coal Gas	1,857 15,348	.95	-
	Bailly	615.6	Coal Gas	1,037 2,107	.77	-
	D. H. Mitchell	529.4	Coal Gas	1,272 4,418	.84	-
76	Whitewater	30.0	Coal	146	1.41	-
77[e]	Petersburg	732.7	Coal	2,019	.7	3.4
	Petersburg (Ratts)	233.2	Coal Oil	719 298	.7 .20	2.9
	Culley	399.7	Coal Oil	1,196 17	.7 .10	2.6
	Ohio River	121.5	Oil Gas	2,680 2,109	.20	-
	Warrick	300.0	Coal Oil Gas	1,933 151 37	.7 .10	-
	Jasper	21.5	Coal	45	2.3	-
	Gibson[d]	650	Coal	2,013	.7	1.5
78[e]	Gallagher	637.0	Coal Oil	1,679 2,143	.7 .31	3.3
79[e]	Tanners Creek	1,100.3	Coal Oil	1,972 1,344	.7 .10	.8

Table C-1. Indiana Power Plant Assessment (Con'd.)

AQCR	Plant	1975 Capacity (Mw)	Estimated 1975 Fuel Use		% S Under SIP Regulations[b]	% S Allowed by Model[c]
			Fuel	Quantity[a]		
80	Perry K & W	59.1	Coal	289	.7	3.2
	H. T. Pritchard	396.4	Coal	640	.7	2.4
			Oil	4,112	.10	
	E. W. Stout	838.8	Coal	1,931	.7	1.8
			Oil	3,373	.30	
	Noblesville	106.0	Coal	116	.9	2.9
			Oil	168	.31	
81	Lawton Park	40.0	Coal	51	1.9	-
82[d]	Twin Branch	394.0	Coal	627	.7	2.9
			Oil	454	.10	
	Michigan City	735.96	Coal	1,817	.7	1.4
			Gas	3,718		
83	Clifty Creek	1,303.6	Coal	3,904	.7	3.1
84	Breed	495.6	Coal	979	.7	3.6
			Oil	168	.10	
	Coyuga	1,018.0	Coal	1,866	.7	2.3
			Oil	613	.31	
	Dresser Station	167.0	Coal	391	.7	3.4
			Oil	1,604	.31	
	Edwardsport	165.0	Coal	420	.7	1.9
			Oil	420	.31	
	Wabash River	881.0	Coal	2,335	.7	1.5
			Oil	4,813	.31	
	Frankfort	32.5	Coal	81	1.8	-
			Oil	1,176	.20[e]	
	Logansport	74.2	Coal	89	1.7	-
			Oil	840	.20[e]	
	Peru	40.0	Coal	60	1.9	-
			Oil	42	.20[e]	

Table C-1. Indiana Power Plant Assessment (Con'd.)

AQCR	Plant	1975 Capacity (Mw)	Estimated 1975 Fuel Use		% S Under SIP Regulations[b]	% S Allowed by Model[c]
			Fuel	Quantity[a]		
84	Crawfordsville	35.2	Coal	84	1.7	-
(Cont'd)	Schahfer[d]	520.95	Coal	1,928	.7	-

[a]Coal quantity is 10^3 tons/yr, oil quantity is 10^3 gal/yr, gas quantity is 10^6 ft^3/yr. Estimates are based on 1971 fuel use patterns plus planned additions. If 1971 fuel use data were unavailable, 1972 data were used.

[b]In dual coal-oil fired plants, only coal is assumed to change. Oil of the same % S as was fired in 1972 was assumed for 1975. The maximum allowable % S is assumed to be the 1971 % S unless the regulations require a lower % S.

[c]Maximum allowable % S is assumed to be 1971 % S unless modeling results show a lower % S allowable.

[d]New plant in 1975.

[e]Interstate

Table C-2. Indiana Power Plant Evaluation Summary

		SO_2							Particulates
		1975 Fuel Required by SIP Regulations[a]			1975 Emissions Reduction[b]	1975 Fuel Required by Modified Regulations[c]			1975 Emission Reduction by SIP Regulations[e]
AQCR	Fuel	< 1%	1-2%	> 2%	(tons/yr)	< 1%	1-2%	> 2%	Modified Emissions Reduction[d] (tons/yr)	(tons/yr)
67[j]	Coal Gas	4,166 21,875			169,431	No modeling results available.				0
76	Coal		146		4,438	No modeling results available.				420
77[j]	Coal Oil Gas	7,880 3,146 2,146		45	217,219	3,146 2,146	2,013[f]	3,934[f]	-125,197[f]	4,902[g]
78[j]	Coal Oil	1,679 2,143			9,023	2,143		1,679	427	0
79[j]	Coal Oil	1,972 1,344			149,500	1,972 1,344			145,670	29,821
80	Coal Oil	2,976 7,653			28,058	7,653	1,931	1,045	-39,612	25,971
81	Coal		51		776	No modeling results available.				1,926
82[j]	Coal Oil Gas	2,444 454 3,718			14,803	454 3,718	1,817	627	-36,467	32,924
83	Coal	3,904			226,149			3,904	44,192	0
84	Coal Oil	7,919 9,676	314		147,019	9,676	2,755[h]	3,236[h]	-42[h]	300[i]

Table C-2. Indiana Power Plant Evaluation Summary (Cont'd.)

[a]Fuel requirements based on 1971 fuel use patterns at 1975 consumption rates. If 1971 fuel data were unavailable, 1972 data were used. Coal quanity is 10^3 tons/yr, oil quantity is 10^3 gal/yr, gas quantity is 10^6 ft^3/yr. Maximum allowable % S is 1971 % S unless regulations require a lower % S.

[b]Emission reduction from current emission rates. Oil of the same % S as was fired in 1972 was assumed for 1975. If actual fuels % S were unknown, state-wide averages were used.

[c]Maximum allowable % S is 1971 % S unless modeling indicates a lower % S. Oil and gas consumption are assumed to remain constant.

[d]Emission reduction from current emission rate.

[e]Emission reduction from current emission rates. Plants already at or below SIP requirements are assumed to remain so. New plants are assumed to meet SIP regulations.

[f]Modeling results available for only 75% of 1975 capacity.

[g]Emissions available for only 67% of 1975 capacity.

[h]Modeling results available for only 79% of 1975 capacity.

[i]Emissions available for 98% of 1975 capacity.

[j]Interstate

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Table D-1. Indiana Industrial/Commercial/Institutional Source Assessment

AQCR	Plant[a]	Fuel[b]	Estimated Fuel Consumption[c]	SIP Regulations % S[d]
67[e]	Inland Steel	Coal	1,227	.84
		Oil	58,599	-
	Atlantic Richfield	Oil	802,548	1.0
	American Oil - (Indianapolis Blvd.)	Oil	1,346,624	1.0
	Youngstown Sheet & Tube	Coal	216	3.36
		Oil	175,414	-
	U.S. Steel - Gary	Coal	224	1.52
		Oil	17,389	-
	Union Carbide	Coal	137	1.48
	American Oil - Whiting	Oil	623,121	1.0
	Mobil Oil	Oil	44,777	1.7
76	Delco Remy	Coal	40	2.17
	GMC - Guide Lamp	Coal	62	1.82
	Anaconda	Coal	13	3.09
	Johns-Manville	Coal	8	3.39
	Indiana State Reformatory	Coal	18	2.79
	Ball State University	Coal	14	3.03
	GM - Fisher Body	Coal	18	2.78
	Nicholson File	Coal	9	3.38
77[e]	General Electric	Coal	57	1.93
	Arkla Air Conditioning	Coal	41	2.11
	Alcoa - Warwick[f]	-	-	-

Table D-1. Indiana Industrial/Commercial/Institutional Source Assessment (Cont'd.)

AQCR	Plant[a]	Fuel[b]	Estimated Fuel Consumption[c]	SIP Regulations % Sd
78[e]	Olin-Ammo Plant	Coal Oil	150 1,520	1.44 -
79[e]	Jos. E. Seagram - Lawrenceburg	Coal	75	1.71
80	National Starch & Chemical	Coal	95	1.60
	Citizens Gas & Coke	Coal Oil	29 297	2.39 -
	Eli Lilly	Coal	61	1.82
	Bridgeport Brass	Coal	24	2.49
	Central Soya - Indy	Coal	19	2.74
	Ford Motor	Coal	46	2.06
	Fort Benj. Harrison	Coal	27	2.39
	Rock Island Refining	Oil	36,348	1.8
	RCA	Coal	24	2.51
	Chrysler	Coal	27	2.39
	Detroit Diesel	Coal Oil	26 13,970	5.90 -
	Evans Milling	Coal	11	3.17
	Western Electric	Coal	35	2.21
	Chevrolet Motor Div.	Coal	26	2.39
81	Central Soya - Decatur	Coal	40	2.10
	Central Soya - Decatur	Coal	40	2.10
	International Harvester	Coal	65	1.82

Table D-1. Indiana Industrial/Commercial/Institutional Source Assessment (Cont'd.)

AQCR	Plant[a]	Fuel[b]	Estimated Fuel Consumption[c]	SIP Regulations % S[d]
82[e]	University of Notre Dame	Coal	45	2.54
		Oil	3,057	-
	Uniroyal	Coal	33	2.27
83	Container Corp. of America	Coal	40	2.11
	Ind. U. - Bloomington	Coal	90	1.65
	Muscatatuck State Hosp.	Coal	18	2.74
84	Commercial Solvents	Coal	83	1.71
	Olin Corp. Film Op.	Coal	79	1.70
	Pfizer	Coal	88	1.65
	Purdue U. - Phys. Plant	Coal	115	1.48
	Weston Paper & Mfg.	Coal	82	1.71
	Chrysler	Coal	66	1.82

[a]Indiana plants contributing 90% of the AQCR's SO_2 and particulate emissions.

[b]Does not include plant or process gas.

[c]Coal in 10^3 tons/yr, oil in 10^3 gals/yr.

[d]For plants using both coal and oil, the % S in the oil was assumed to remain at present levels. Within a given plant, there may be particular units fired primarily on oil which would not be in compliance firing such oil.
Since unit-by-unit fuel mix data was unavailable, compliance was required on a plant-wide basis.

[e]Interstate

[f]This plant is a joint industrial-electric utility facility and has been included in the power plant category.

Table D-2. Indiana Industrial/Commercial/Institutional Source Evaluation Summary

AQCR	Fuel	Fuel Required by Existing Regulations[a] <1%	1-2%	>2%	SO_2 Emission Reduction[b] (tons/yr)
67[e]	Coal	1,227	361[d]	216	
	Oil	251,402[c]	2,817,070[d]		-133,716
76	Coal		62	120	2,073
77[e]	Coal	-[f]	57	41	2,001
78[e]	Coal		150		6,696
	Oil	1,520[c]			
79[e]	Coal		75		2,747
80	Coal		156[d]	294	
	Oil	14,267[c]	36,348[d]		-1,694
81	Coal		65	80	2,847
82[e]	Coal			78	
	Oil	3,057[c]			456
83	Coal		90	58	4,505
84	Coal		513		8,976

[a]Does not include plant or process gas.
Coal in 10^3 tons/yr; oil in 10^3 gals/yr.
Since unit-by-unit fuel mix data was unavailable, compliance was determined on a plant-wide basis.

[b]Emission reduction from current rates.
Does not include any reductions from required desulfurization of process gases.

[c]For dual coal and oil fired plants the % S in the oil was assumed to remain at present levels.

[d]Current SIP regulations require a minimum of 1% S oil.

[e]Interstate

[f]Does not include coal burned at the ALCOA-Warrick plant which is listed as a power plant.

TABLE E-1. Indiana Area Source Fuel Use

AQCR	Coal (10^3 tons/yr)	Distillate Oil (10^3 gals/yr)	Residual Oil (10^3 gals/yr)	Natural Gas (10^6 ft^3/yr)
67[a]	1,412	1,274,170	468,050	650,710
76	34	77,700	3,230	60,400
77[a]	137	48,960	3,850	43,570
78[a]	380	81,440	14,260	64,350
79[a]	678	218,400	2,070	131,990
80[a]	76	184,460	5,040	98,620
81	43	72,580	2,480	46,560
82[a]	118	175,910	9,710	75,620
83	69	88,780	2,380	46,670
84	94	116,990	3,310	71,910
TOTAL	3,041	2,339,390	514,380	1,290,400

[a]Interstate - Fuel use figures are for entire AQCR.

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TABLE F-1. Indiana Clean Fuels Analysis Summary

AQCR	Fuel	Existing Regulations Clean Fuel Requirements[a] ≤ 1% S	Existing Regulations Clean Fuel Requirements[a] 1-2% S	Modified Regulations Clean Fuel Requirements[b] ≤ 1% S	Modified Regulations Clean Fuel Requirements[b] 1-2% S
6[c]	Coal	5,393	361	[d]	
7b	Coal		208	[e]	
--[c]	Coal	7,880	57		2,670
78[c]	Coal	1,679	150		150
79[c]	Coal	1,972	75	1,972	75
80	Coal	2,670	150		2,08[illegible]
81	Coal		118	[e]	
82[c]	Coal	2,[illegible]82			1,81[illegible]
83	Coal	3,3[illegible]4	90		90
84	Coal	7,979	67		1,[illegible]86
State Total	Coal	34,[illegible]57	2,[illegible]49	8,781[f]	9,[illegible]17[f]

[a] "Free power plant", industrial/commercial/institutional point sources. Includes only that required and not entire fuel consumption. Coal in 10^3 tons/yr, oil in 10^3 gals/yr, gas in 10^6 ft^3/yr.

[b] Based on modeling results. Since Indiana regulations permit fuel switching for compliance it is assumed that oil and gas characteristics and use will be constant while coal sulfur content is modified. No modeling results available for industrial/commercial/institutional sources; fuel consumption was assumed to remain at SIP requirements.
Includes only that required and not entire consumption

[c] Interstate

[d] Although no modeling results are available, the regional analysis indicates that no shift to higher fuel sulfur content could be tolerated.

[e] Although no modeling results are available, the regional analysis indicates that some shift to higher fuel sulfur content could be tolerated.

[f] Incomplete picture of clean fuels savings due to lack of modeling data in all AQCRs.

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